

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1]A cell case accommodating and piling up a sheet container which enclosed a power generation element for an upper case which formed a resin frame in an edge part of an aluminum plate fabricated to dish by insert molding, and a lower case among these, and joining resin frames.

[Claim 2]By piling up an upper case and a lower case which formed a resin frame in an edge part of a metal plate by insert molding, and joining resin frames, A cell case having used an aluminum plate as a metal plate of an up-and-down case, and providing a concave or convex reinforcement section in a plate surface of these aluminum plates in a cell case which accommodated a sheet container which enclosed a power generation element with an inside between these up-and-down cases.

[Claim 3]The cell case according to claim 1 or 2 in which the above-mentioned aluminum plate is characterized by forming an insulating oxide layer in the surface of alumite treatment.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

## DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the cell case which accommodates sheet containers, such as an aluminum laminate sheet which enclosed the power generation element.

[0002]

[Description of the Prior Art]In connection with the rapid small weight saving of a portable electronic device in recent years, development of the rechargeable battery which is lightweight, and is a thin type, and has high energy density is demanded also from the cell which is the power supply. Then, the card shape cell which attained lightweight thin type-ization is developed from the former by using this nonaqueous electrolyte secondary battery as a card shape, using a nonaqueous electrolyte secondary battery as a rechargeable battery which has high energy density.

[0003]As shown in drawing 8, a card shape cell covers the aluminum laminate sheet container 1 which enclosed the flat tip-like power generation element with the cell case which consists of the upper case 2 and the lower case 3, and accommodates it in an inside. The up-and-down cases 2 and 3 all form the resin frames 2c and 3c in the edge part of the plate-like stainless plates 2e and 3e by insert molding. The aluminum laminate sheet container 1 is accommodated in an inside by piling up these up-and-down cases 2 and 3, and joining the resin frame 2c of an edge part, and 3c by ultrasonic welding.

[0004]

[Problem(s) to be Solved by the Invention]However, since the cell case of the conventional card shape cell used the stainless plates 2e and 3e for the up-and-down cases 2 and 3, intensity was enough, but there was a problem of weight having become heavy too much and checking the weight saving of a cell.

[0005]When the stainless plates 2e and 3e were used, insulating tape needed to be stuck on the inner surface of these stainless plates 2e and 3e for the insulation with the lead 1a etc. which were pulled out from the aluminum laminate sheet container 1, and there was also a problem that the process of operation at the time of a cell assembly increased.

[0006]By making this invention in view of this situation, and using an aluminum plate for an up-and-down case, It aims at providing the cell case which has lightweight and sufficient intensity by providing a concave or convex reinforcement section in this aluminum plate for the purpose of providing the cell case which can attain the weight saving of a cell and.

[0007]

[Means for Solving the Problem]An invention of claim 1 accommodates and piles up a sheet container which enclosed a power generation element for an upper case which formed a resin frame in an edge part of an aluminum plate fabricated to dished by insert molding, and a lower case among these, and it joined resin frames.

[0008]Since an aluminum plate is used for an up-and-down case according to the invention of claim

1, a weight saving of a cell can be attained compared with a case where a stainless plate is used. When intensity sufficient by thickness comparable as a stainless plate here is not obtained, it is necessary to form an aluminum plate somewhat thickly but, and. Since specific gravity of an aluminum plate is dramatically small compared with a stainless plate, even if this board thickness becomes to some extent thick, it is possible to fully attain a weight saving. The aluminum plate refers to what made aluminum or an aluminum alloy tabular.

[0009]An invention of claim 2 by piling up an upper case and a lower case which formed a resin frame in an edge part of a metal plate by insert molding, and joining resin frames, In a cell case which accommodated a sheet container which enclosed a power generation element with an inside between these up-and-down cases, an aluminum plate was used as a metal plate of an up-and-down case, and a concave or convex reinforcement section was provided in a plate surface of these aluminum plates.

[0010]Since an aluminum plate is used for an up-and-down case according to the invention of claim 2, compared with a case where a stainless plate is used, a weight saving of a cell can be attained like a case of claim 1. And since sufficient intensity can be obtained by providing a concave or convex reinforcement section in a plate surface of these aluminum plates, it also becomes possible to use board thickness comparable as a stainless plate, and further weight saving can be attained. Curvature can also be prevented from arising in a plate surface of an aluminum plate with heating in the case of insert molding by providing this reinforcement section.

[0011]As for an invention of claim 3, an insulating oxide layer is formed in the surface for the above-mentioned aluminum plate of alumite treatment.

[0012]According to the invention of claim 3, since the surface of an aluminum plate of an up-and-down case is covered by an insulating oxide layer formed of alumite treatment, it becomes unnecessary to perform an insulation process with an internal lead etc., and a man day can be reduced.

[0013]

[Embodiment of the Invention]Hereafter, the embodiment of this invention is described with reference to drawings.

[0014]Drawing 1 is an exploded perspective view in which showing a 1st embodiment of this invention and showing the composition of a card shape cell. The same number is appended to the members forming which has the same function as the conventional example shown in drawing 8.

[0015]This embodiment explains the card shape cell which used the nonaqueous electrolyte secondary battery as the card shape like the conventional example. A card shape cell accommodates the aluminum laminate sheet container 1 in the inside of the cell case which consists of the upper case 2 and the lower case 3. The power generation element made to flat-tip-ize is sealed hermetically in the aluminum laminate sheet container 1 with nonaqueous electrolyte by winding and crushing positive and negative poles via a separator, for example. And the flexible aluminum laminate sheet of two sheets is piled up, and an inside is sealed by closing the circumference, or folding and piling up the aluminum laminate sheet of one sheet, and closing the circumferences other than a fold. However, from the sealed part of this aluminum laminate sheet container 1, the lead 1a connected to the positive and negative poles of an internal power generation element is pulled out, respectively. An aluminum laminate sheet is a sheet which laminated a PET (polyethylene terephthalate) film, a polyethylene film, etc. in aluminium foil, and can be closed by hot welding by piling up and carrying out heating compression of the field of sides, such as a polyethylene film. Closure of the interface with metal is ensured by making the Eval resin film etc. intervene at the drawer part of the lead 1a.

[0016]The upper case 2 forms the resin frame 2c in the edge part of the aluminum plate 2a. The lower case 3 also forms the resin frame 3c in the edge part of the aluminum plate 3a. These aluminum plates 2a and 3a are the plates of the rectangle which consists of an aluminum alloy which makes aluminum or aluminum a subject. These aluminum plates 2a and 3a are fabricated to dished in

order to enlarge flexural rigidity. Said resin frames 2c and 3c are the frames formed in the edge part of these aluminum plates 2a and 3a of insert molding. In order to carry out insert molding of two or more sheets continuously, these aluminum plates 2a and 3a connect between the adjoining aluminum plates 2a and 3a by the bridge parts 2d and 3d, and as each bridge parts 2d and 3d are cut, they are manufacturing them after shaping of the resin frames 2c and 3c.

[0017]The above-mentioned up-and-down cases 2 and 3 turn into a cell case by making the aluminum laminate sheet container 1 intervene in between, and piling it up from the upper and lower sides. Under the present circumstances, the resin sheets 4 and 4 of electrolysis solution-proof nature are stuck on the inner surface of the up-and-down cases 2 and 3. The lead 1a pulled out from this aluminum laminate sheet container 1 is connected to the terminal which was provided in the resin frames 2c and 3c of the upper case 2 or the lower case 3 and which is not illustrated inside the cell case. Thus, the piled up-and-down cases 2 and 3 complete a cell case by carrying out fusion joining of the undersurface of the resin frame 2c, and the upper surface of the resin frame 3c by ultrasonic welding.

[0018]The above-mentioned resin sheets 4 and 4 are the protective films for this nonaqueous electrolyte corroding the aluminum plates 2a and 3a, and keeping it from coming outside, also when reactant high nonaqueous electrolyte begins to leak from the inside of the aluminum laminate sheet container 1. Therefore, the resin layer of the same raw material as these resin sheets 4 and 4 is beforehand covered to the inner surface of the aluminum plates 2a and 3a, and it may be made to carry out insert molding of the resin frames 2c and 3c in this state. These resin sheets 4 and 4 play the role of the insulation between the inner surface of the aluminum plates 2a and 3a, and the lead 1a as well as the insulating tape stuck on the inner surface of the conventional stainless plates 2e and 3e.

[0019]Since the lightweight aluminum plates 2a and 3a are used for the up-and-down cases 2 and 3 according to the cell case of the above-mentioned composition, the weight saving of a cell can be attained compared with the case where the heavy stainless plates 2e and 3e are used like the conventional example shown in drawing 8. That is, since intensity is weak in the same board thickness as the stainless plates 2e and 3e, a usually to some extent thick thing needs to be used for these aluminum plates 2a and 3a, but. Since the specific gravity of aluminum or an aluminum alloy is dramatically small compared with stainless steel, even if this board thickness becomes to some extent thick, a weight saving can fully be attained.

[0020]Although the case where stuck the resin sheets 4 and 4 on the inner surface of the aluminum plates 2a and 3a, or a resin layer was covered with this embodiment was explained, the insulating oxide layer may be formed in the surface by performing alumite treatment to this aluminum plate 2a beforehand. Since the prevention of corrosion and the insulation of the lead 1a by nonaqueous electrolyte can be performed if such an insulating oxide layer is formed, the process of sticking the resin sheets 4 and 4 or covering a resin layer becomes unnecessary.

[0021]The exploded perspective view in which drawing 2 - drawing 7 show a 2nd embodiment of this invention, and drawing 2 shows the composition of a card shape cell, Decomposition drawing of longitudinal section in which drawing 3 shows the composition of a card shape cell, decomposition drawing of longitudinal section showing the composition of the up-and-down case of everything [ drawing 4 ] but a card shape cell, The top view and drawing 7 in which the case where the top view and drawing 6 in which the case where drawing 5 provides the reinforcement section of the letter of x seal in the aluminum plate of an up-and-down case is shown provide the reinforcement section of parallel state in the aluminum plate of an up-and-down case is shown are a top view showing the case where a logo-like reinforcement section is provided in the aluminum plate of an up-and-down case. The same number is appended to the members forming which has the same function as a 1st embodiment shown in drawing 1.

[0022]This embodiment also explains the card shape cell which used the nonaqueous electrolyte secondary battery as the card shape like a 1st embodiment. A card shape cell accommodates the

aluminum laminate sheet container 1 in the inside of the cell case which consists of the upper case 2 and the lower case 3, as shown in drawing 2. What was shown by a 1st embodiment, and the same thing are used for the aluminum laminate sheet container 1.

[0023]The upper case 2 forms the resin frame 2c in the edge part of the aluminum plate 2a, and the lower case 3 also forms the resin frame 3c in the edge part of the aluminum plate 3a. These aluminum plates 2a and 3a are the plates of the rectangle which consists of an aluminum alloy which makes aluminum or aluminum a subject like a 1st embodiment, The resin frames 2c and 3c are also the frames in which integral moulding was carried out to the edge part of these aluminum plates 2a and 3a by insert molding. However, as shown in drawing 3, convex and concave reinforcement section 2b which the center section projected rectangularly by press working of sheet metal, and the thing in which 3b was formed are used for the aluminum plates 2a and 3a. These aluminum plates 2a and 3a form the insulating oxide layer in the surface by performing alumite treatment beforehand. These aluminum plates 2a and 3a as well as the case of a 1st embodiment can use what cut each bridge parts 2d and 3d after shaping of the resin frames 2c and 3c.

[0024]The above-mentioned up-and-down cases 2 and 3 make the aluminum laminate sheet container 1 intervene in between, are piled up from the upper and lower sides, and are used as a cell case by carrying out fusion joining of the undersurface of the resin frame 2c, and the upper surface of the resin frame 3c by ultrasonic welding. In this case, the lead 1a pulled out from the aluminum laminate sheet container 1 is connected to the terminal which was provided in the resin frames 2c and 3c of the upper case 2 or the lower case 3 and which is not illustrated inside the cell case.

[0025]Since the lightweight aluminum plates 2a and 3a are used for the up-and-down cases 2 and 3 according to the cell case of the above-mentioned composition, the weight saving of a cell can be attained like the case of a 1st embodiment. And since rugged form reinforcement section 2b and 3b are formed in the plate surface of these aluminum plates 2a and 3a, sufficient intensity can be obtained even if it uses the thing of board thickness comparable as the rigid high stainless plates 2e and 3e. Namely, in using the aluminum laminate sheet container 1 which laminated the strong PET film etc. like this embodiment. Intensity in which intensity equivalent to the stainless plates 2e and 3e of the same board thickness is unnecessary, and it is also sufficient having formed reinforcement section 2b and 3b in such aluminum plates 2a and 3a to protect the inside of a cell can be obtained. The weight saving of a 1st more than embodiment can be attained now by making these aluminum plates 2a and 3a into board thickness comparable as the conventional stainless plates 2e and 3e.

[0026]Supposing it is plate-like like [ in case the aluminum plates 2a and 3a are a 1st embodiment ], when the resin frames 2c and 3c are fabricated by insert molding to this, there is a possibility that curvature may arise in the plate surface of the aluminum plates 2a and 3a with heating in the case of this fabricating operation. However, like the above-mentioned composition, if rugged form reinforcement section 2b and 3b are formed in the aluminum plates 2a and 3a, generating of this curvature can also be prevented.

[0027]Since the aluminum plates 2a and 3a of the up-and-down cases 2 and 3 are covered by an insulating oxide layer according to the cell case of the above-mentioned composition, In order to prevent the corrosion by the nonaqueous electrolyte which began to leak from the aluminum laminate sheet container 1 in order to insulate the lead 1a pulled out from the aluminum laminate sheet container 1, The troublesome process of operation which sticks insulating tape and the resin sheets 4 and 4 on the inner surface of these aluminum plates 2a and 3a also becomes unnecessary, and can simplify assembling work now.

[0028]Although the above-mentioned embodiment showed reinforcement section 2b projected on the outside of the cell case, and 3b, it may be made to make it project to the inside side of a cell case, as shown in drawing 4. In the above-mentioned embodiment, although such reinforcement section 2bs and 3b were considered as the rectangular projection, this invention can use the projection of not only this but arbitrary shape. For example, as are shown in drawing 5 and drawing 6, and reinforcement section 2b which the projection of the shape of a rib with two long and slender

muscles was made to cross in the shape of a x seal, or was put in order in parallel, and 3b can also be provided and it is shown in drawing 7, a logo [ \*\*\*\* ] can be displayed by this projection and it can also be referred to as reinforcement section 2b and 3b.

[0029]In the above 1st and a 2nd embodiment, in order to join the up-and-down cases 2 and 3, ultrasonic welding was used, but arbitrary join means, such as other welding means and adhesion, can be used.

[0030]Although the aluminum laminate sheet container 1 was used in the above 1st and a 2nd embodiment, this invention is not necessarily limited to this, in \*\*\*\*, a sheet container can be used for arbitrary web materials, and a cell is not limited to them by the card shape, either. The composition of the power generation element enclosed with an inside is also arbitrary, and it is feasible similarly about cells other than a nonaqueous electrolyte secondary battery.

[0031]

[Effect of the Invention]According to the cell case of this invention, the weight saving of a cell can be attained by using an aluminum plate for an up-and-down case so that clearly from the above explanation.

[0032]Sufficient intensity can be obtained by providing a concave or convex reinforcement section in the plate surface of this aluminum plate, and generating of the curvature in the case of insert molding can also be prevented.

[0033]The work which sticks insulating tape on the inner surface of this aluminum plate can also be done unnecessary by forming the insulating oxide layer by alumite treatment in the surface of the aluminum plate of an up-and-down case.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

TECHNICAL FIELD

---

[Field of the Invention]This invention relates to the cell case which accommodates sheet containers, such as an aluminum laminate sheet which enclosed the power generation element.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

PRIOR ART

---

[Description of the Prior Art]In connection with the rapid small weight saving of a portable electronic device in recent years, development of the rechargeable battery which it is lightweight, and is a thin type, and has high energy density is demanded also from the cell which is the power supply. Then, the card shape cell which attained lightweight thin type-ization is developed from the former by using this nonaqueous electrolyte secondary battery as a card shape, using a nonaqueous electrolyte secondary battery as a rechargeable battery which has high energy density.

[0003]As shown in drawing 8, a card shape cell covers the aluminum laminate sheet container 1 which enclosed the flat tip-like power generation element with the cell case which consists of the upper case 2 and the lower case 3, and accommodates it in an inside. The up-and-down cases 2 and 3 all form the resin frames 2c and 3c in the edge part of the plate-like stainless plates 2e and 3e by insert molding, The aluminum laminate sheet container 1 is accommodated in an inside by piling up these up-and-down cases 2 and 3, and joining the resin frame 2c of an edge part, and 3c by ultrasonic welding.

---

[Translation done.]



\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

EFFECT OF THE INVENTION

---

[Effect of the Invention]According to the cell case of this invention, the weight saving of a cell can be attained by using an aluminum plate for an up-and-down case so that clearly from the above explanation.

[0032]Sufficient intensity can be obtained by providing a concave or convex reinforcement section in the plate surface of this aluminum plate, and generating of the curvature in the case of insert molding can also be prevented.

[0033]The work which sticks insulating tape on the inner surface of this aluminum plate can also be done unnecessary by forming the insulating oxide layer by alumite treatment in the surface of the aluminum plate of an up-and-down case.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention]However, since the cell case of the conventional card shape cell used the stainless plates 2e and 3e for the up-and-down cases 2 and 3, intensity was enough, but there was a problem of weight having become heavy too much and checking the weight saving of a cell.

[0005]When the stainless plates 2e and 3e were used, insulating tape needed to be stuck on the inner surface of these stainless plates 2e and 3e for the insulation with the lead 1a etc. which were pulled out from the aluminum laminate sheet container 1, and there was also a problem that the process of operation at the time of a cell assembly increased.

[0006]By making this invention in view of this situation, and using an aluminum plate for an up-and-down case, It aims at providing the cell case which has lightweight and sufficient intensity by providing a concave or convex reinforcement section in this aluminum plate for the purpose of providing the cell case which can attain the weight saving of a cell and.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

MEANS

---

[Means for Solving the Problem]An invention of claim 1 accommodates and piles up a sheet container which enclosed a power generation element for an upper case which formed a resin frame in an edge part of an aluminum plate fabricated to dished by insert molding, and a lower case among these, and it joined resin frames.

[0008]Since an aluminum plate is used for an up-and-down case according to the invention of claim 1, a weight saving of a cell can be attained compared with a case where a stainless plate is used. When intensity sufficient by thickness comparable as a stainless plate here is not obtained, it is necessary to form an aluminum plate somewhat thickly but, and. Since specific gravity of an aluminum plate is dramatically small compared with a stainless plate, even if this board thickness becomes to some extent thick, it is possible to fully attain a weight saving. The aluminum plate refers to what made aluminum or an aluminum alloy tabular.

[0009]An invention of claim 2 by piling up an upper case and a lower case which formed a resin frame in an edge part of a metal plate by insert molding, and joining resin frames, In a cell case which accommodated a sheet container which enclosed a power generation element with an inside between these up-and-down cases, an aluminum plate was used as a metal plate of an up-and-down case, and a concave or convex reinforcement section was provided in a plate surface of these aluminum plates.

[0010]Since an aluminum plate is used for an up-and-down case according to the invention of claim 2, compared with a case where a stainless plate is used, a weight saving of a cell can be attained like a case of claim 1. And since sufficient intensity can be obtained by providing a concave or convex reinforcement section in a plate surface of these aluminum plates, it also becomes possible to use board thickness comparable as a stainless plate, and further weight saving can be attained. Curvature can also be prevented from arising in a plate surface of an aluminum plate with heating in the case of insert molding by providing this reinforcement section.

[0011]As for an invention of claim 3, an insulating oxide layer is formed in the surface for the above-mentioned aluminum plate of alumite treatment.

[0012]According to the invention of claim 3, since the surface of an aluminum plate of an up-and-down case is covered by an insulating oxide layer formed of alumite treatment, it becomes unnecessary to perform an insulation process with an internal lead etc., and a man day can be reduced.

[0013]

[Embodiment of the Invention]Hereafter, the embodiment of this invention is described with reference to drawings.

[0014]Drawing 1 is an exploded perspective view in which showing a 1st embodiment of this invention and showing the composition of a card shape cell. The same number is appended to the members forming which has the same function as the conventional example shown in drawing 8.

[0015]This embodiment explains the card shape cell which used the nonaqueous electrolyte

secondary battery as the card shape like the conventional example. A card shape cell accommodates the aluminum laminate sheet container 1 in the inside of the cell case which consists of the upper case 2 and the lower case 3. The power generation element made to flat-tip-ize is sealed hermetically in the aluminum laminate sheet container 1 with nonaqueous electrolyte by winding and crushing positive and negative poles via a separator, for example. And the flexible aluminum laminate sheet of two sheets is piled up, and an inside is sealed by closing the circumference, or folding and piling up the aluminum laminate sheet of one sheet, and closing the circumferences other than a fold. However, from the sealed part of this aluminum laminate sheet container 1, the lead 1a connected to the positive and negative poles of an internal power generation element is pulled out, respectively. An aluminum laminate sheet is a sheet which laminated a PET (polyethylene terephthalate) film, a polyethylene film, etc. in aluminium foil, and can be closed by hot welding by piling up and carrying out heating compression of the field of sides, such as a polyethylene film. Closure of the interface with metal is ensured by making the Eval resin film etc. intervene at the drawer part of the lead 1a.

[0016]The upper case 2 forms the resin frame 2c in the edge part of the aluminum plate 2a. The lower case 3 also forms the resin frame 3c in the edge part of the aluminum plate 3a. These aluminum plates 2a and 3a are the plates of the rectangle which consists of an aluminum alloy which makes aluminum or aluminum a subject. These aluminum plates 2a and 3a are fabricated to dished in order to enlarge flexural rigidity. Said resin frames 2c and 3c are the frames formed in the edge part of these aluminum plates 2a and 3a of insert molding. In order to carry out insert molding of two or more sheets continuously, these aluminum plates 2a and 3a connect between the adjoining aluminum plates 2a and 3a by the bridge parts 2d and 3d, and as each bridge parts 2d and 3d are cut, they are manufacturing them after shaping of the resin frames 2c and 3c.

[0017]The above-mentioned up-and-down cases 2 and 3 turn into a cell case by making the aluminum laminate sheet container 1 intervene in between, and piling it up from the upper and lower sides. Under the present circumstances, the resin sheets 4 and 4 of electrolysis solution-proof nature are stuck on the inner surface of the up-and-down cases 2 and 3. The lead 1a pulled out from this aluminum laminate sheet container 1 is connected to the terminal which was provided in the resin frames 2c and 3c of the upper case 2 or the lower case 3 and which is not illustrated inside the cell case. Thus, the piled up-and-down cases 2 and 3 complete a cell case by carrying out fusion joining of the undersurface of the resin frame 2c, and the upper surface of the resin frame 3c by ultrasonic welding.

[0018]The above-mentioned resin sheets 4 and 4 are the protective films for this nonaqueous electrolyte corroding the aluminum plates 2a and 3a, and keeping it from coming outside, also when reactant high nonaqueous electrolyte begins to leak from the inside of the aluminum laminate sheet container 1. Therefore, the resin layer of the same raw material as these resin sheets 4 and 4 is beforehand covered to the inner surface of the aluminum plates 2a and 3a, and it may be made to carry out insert molding of the resin frames 2c and 3c in this state. These resin sheets 4 and 4 play the role of the insulation between the inner surface of the aluminum plates 2a and 3a, and the lead 1a as well as the insulating tape stuck on the inner surface of the conventional stainless plates 2e and 3e.

[0019]Since the lightweight aluminum plates 2a and 3a are used for the up-and-down cases 2 and 3 according to the cell case of the above-mentioned composition, the weight saving of a cell can be attained compared with the case where the heavy stainless plates 2e and 3e are used like the conventional example shown in drawing 8. That is, since intensity is weak in the same board thickness as the stainless plates 2e and 3e, a usually to some extent thick thing needs to be used for these aluminum plates 2a and 3a, but. Since the specific gravity of aluminum or an aluminum alloy is dramatically small compared with stainless steel, even if this board thickness becomes to some extent thick, a weight saving can fully be attained.

[0020]Although the case where stuck the resin sheets 4 and 4 on the inner surface of the aluminum

plates 2a and 3a, or a resin layer was covered with this embodiment was explained, the insulating oxide layer may be formed in the surface by performing alumite treatment to this aluminum plate 2a beforehand. Since the prevention of corrosion and the insulation of the lead 1a by nonaqueous electrolyte can be performed if such an insulating oxide layer is formed, the process of sticking the resin sheets 4 and 4 or covering a resin layer becomes unnecessary.

[0021]The exploded perspective view in which drawing 2 – drawing 7 show a 2nd embodiment of this invention, and drawing 2 shows the composition of a card shape cell, Decomposition drawing of longitudinal section in which drawing 3 shows the composition of a card shape cell, decomposition drawing of longitudinal section showing the composition of the up-and-down case of everything [ drawing 4 ] but a card shape cell, The top view and drawing 7 in which the case where the top view and drawing 6 in which the case where drawing 5 provides the reinforcement section of the letter of x seal in the aluminum plate of an up-and-down case is shown provide the reinforcement section of parallel state in the aluminum plate of an up-and-down case is shown are a top view showing the case where a logo-like reinforcement section is provided in the aluminum plate of an up-and-down case. The same number is appended to the members forming which has the same function as a 1st embodiment shown in drawing 1.

[0022]This embodiment also explains the card shape cell which used the nonaqueous electrolyte secondary battery as the card shape like a 1st embodiment. A card shape cell accommodates the aluminum laminate sheet container 1 in the inside of the cell case which consists of the upper case 2 and the lower case 3, as shown in drawing 2. What was shown by a 1st embodiment, and the same thing are used for the aluminum laminate sheet container 1.

[0023]The upper case 2 forms the resin frame 2c in the edge part of the aluminum plate 2a, and the lower case 3 also forms the resin frame 3c in the edge part of the aluminum plate 3a. These aluminum plates 2a and 3a are the plates of the rectangle which consists of an aluminum alloy which makes aluminum or aluminum a subject like a 1st embodiment, The resin frames 2c and 3c are also the frames in which integral moulding was carried out to the edge part of these aluminum plates 2a and 3a by insert molding. However, as shown in drawing 3, convex and concave reinforcement section 2b which the center section projected rectangularly by press working of sheet metal, and the thing in which 3b was formed are used for the aluminum plates 2a and 3a. These aluminum plates 2a and 3a form the insulating oxide layer in the surface by performing alumite treatment beforehand. These aluminum plates 2a and 3a as well as the case of a 1st embodiment can use what cut each bridge parts 2d and 3d after shaping of the resin frames 2c and 3c.

[0024]The above-mentioned up-and-down cases 2 and 3 make the aluminum laminate sheet container 1 intervene in between, are piled up from the upper and lower sides, and are used as a cell case by carrying out fusion joining of the undersurface of the resin frame 2c, and the upper surface of the resin frame 3c by ultrasonic welding. In this case, the lead 1a pulled out from the aluminum laminate sheet container 1 is connected to the terminal which was provided in the resin frames 2c and 3c of the upper case 2 or the lower case 3 and which is not illustrated inside the cell case.

[0025]Since the lightweight aluminum plates 2a and 3a are used for the up-and-down cases 2 and 3 according to the cell case of the above-mentioned composition, the weight saving of a cell can be attained like the case of a 1st embodiment. And since rugged form reinforcement section 2b and 3b are formed in the plate surface of these aluminum plates 2a and 3a, sufficient intensity can be obtained even if it uses the thing of board thickness comparable as the rigid high stainless plates 2e and 3e. Namely, in using the aluminum laminate sheet container 1 which laminated the strong PET film etc. like this embodiment. Intensity in which intensity equivalent to the stainless plates 2e and 3e of the same board thickness is unnecessary, and it is also sufficient having formed reinforcement section 2b and 3b in such aluminum plates 2a and 3a to protect the inside of a cell can be obtained. The weight saving of a 1st more than embodiment can be attained now by making these aluminum plates 2a and 3a into board thickness comparable as the conventional stainless plates 2e and 3e.

[0026]Supposing it is plate-like like [ in case the aluminum plates 2a and 3a are a 1st embodiment ],

when the resin frames 2c and 3c are fabricated by insert molding to this, there is a possibility that curvature may arise in the plate surface of the aluminum plates 2a and 3a with heating in the case of this fabricating operation. However, like the above-mentioned composition, if rugged form reinforcement section 2b and 3b are formed in the aluminum plates 2a and 3a, generating of this curvature can also be prevented.

[0027] Since the aluminum plates 2a and 3a of the up-and-down cases 2 and 3 are covered by an insulating oxide layer according to the cell case of the above-mentioned composition, In order to prevent the corrosion by the nonaqueous electrolyte which began to leak from the aluminum laminate sheet container 1 in order to insulate the lead 1a pulled out from the aluminum laminate sheet container 1, The troublesome process of operation which sticks insulating tape and the resin sheets 4 and 4 on the inner surface of these aluminum plates 2a and 3a also becomes unnecessary, and can simplify assembling work now.

[0028] Although the above-mentioned embodiment showed reinforcement section 2b projected on the outside of the cell case, and 3b, it may be made to make it project to the inside side of a cell case, as shown in drawing 4. In the above-mentioned embodiment, although such reinforcement section 2bs and 3b were considered as the rectangular projection, this invention can use the projection of not only this but arbitrary shape. For example, as are shown in drawing 5 and drawing 6, and reinforcement section 2b which the projection of the shape of a rib with two long and slender muscles was made to cross in the shape of a x seal, or was put in order in parallel, and 3b can also be provided and it is shown in drawing 7, a logo [ \*\*\*\* ] can be displayed by this projection and it can also be referred to as reinforcement section 2b and 3b.

[0029] In the above 1st and a 2nd embodiment, in order to join the up-and-down cases 2 and 3, ultrasonic welding was used, but arbitrary join means, such as other welding means and adhesion, can be used.

[0030] Although the aluminum laminate sheet container 1 was used in the above 1st and a 2nd embodiment, this invention is not necessarily limited to this, in \*\*\*\*, a sheet container can be used for arbitrary web materials, and a cell is not limited to them by the card shape, either. The composition of the power generation element enclosed with an inside is also arbitrary, and it is feasible similarly about cells other than a nonaqueous electrolyte secondary battery.

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

---

## DESCRIPTION OF DRAWINGS

---

[Brief Description of the Drawings]

[Drawing 1]It is an exploded perspective view in which showing a 1st embodiment of this invention and showing the composition of a card shape cell.

[Drawing 2]It is an exploded perspective view in which showing a 2nd embodiment of this invention and showing the composition of a card shape cell.

[Drawing 3]It is decomposition drawing of longitudinal section in which showing a 2nd embodiment of this invention and showing the composition of a card shape cell.

[Drawing 4]It is decomposition drawing of longitudinal section in which showing a 2nd embodiment of this invention and showing the composition of other up-and-down cases of a card shape cell.

[Drawing 5]It is a top view showing a 2nd embodiment of this invention and showing the case where the reinforcement section of the letter of x seal is provided in the aluminum plate of an up-and-down case.

[Drawing 6]It is a top view showing a 2nd embodiment of this invention and showing the case where the reinforcement section of parallel state is provided in the aluminum plate of an up-and-down case.

[Drawing 7]It is a top view showing a 2nd embodiment of this invention and showing the case where a logo-like reinforcement section is provided in the aluminum plate of an up-and-down case.

[Drawing 8]It is an exploded perspective view in which showing a conventional example and showing the composition of a card shape cell.

[Description of Notations]

1 Aluminum laminate sheet container

2 Upper case

2a Aluminum plate

2b Reinforcement section

2c Resin frame

3 Lower case

3a Aluminum plate

3b Reinforcement section

3c Resin frame

---

[Translation done.]

\* NOTICES \*

JPO and INPIT are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

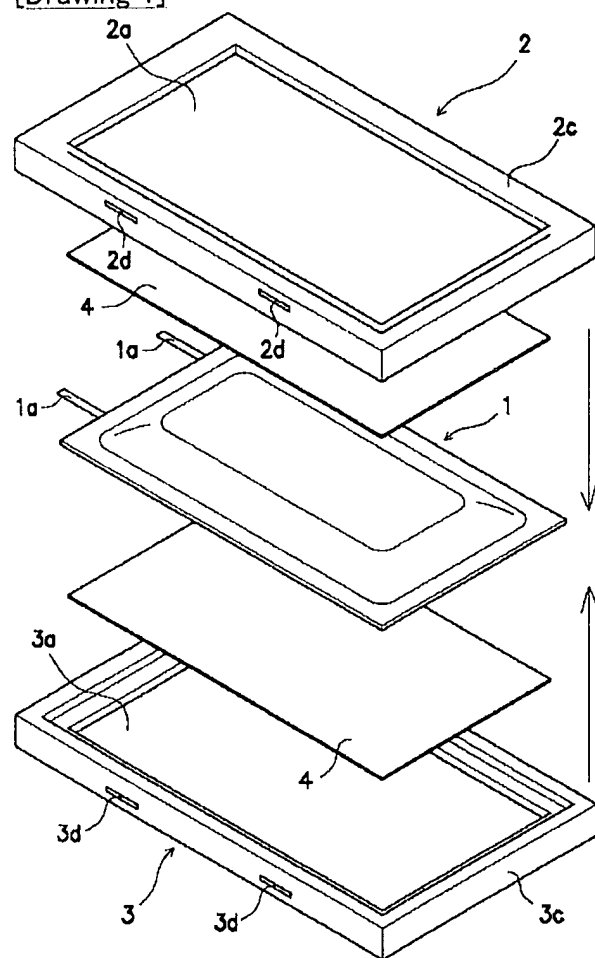
3.In the drawings, any words are not translated.

---

## DRAWINGS

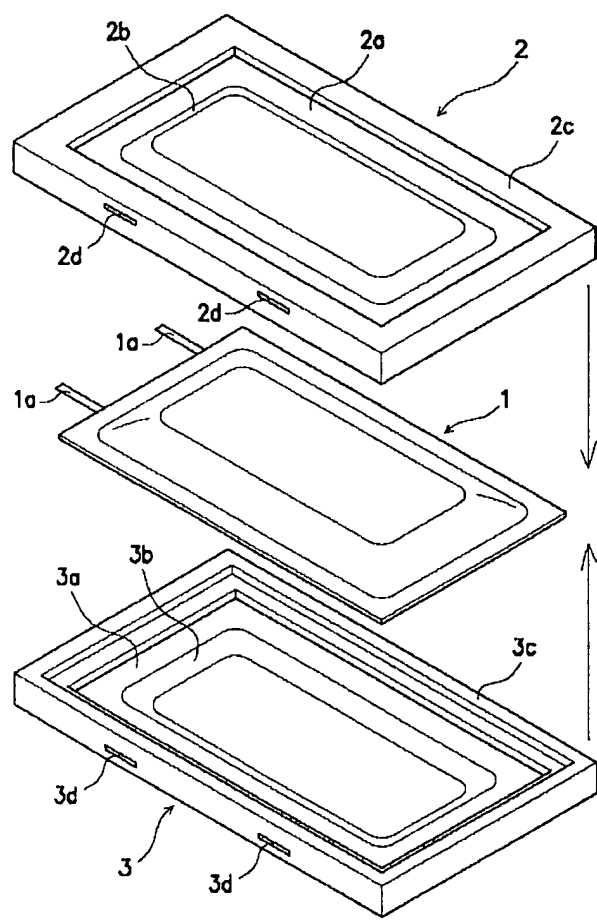
---

[Drawing 1]

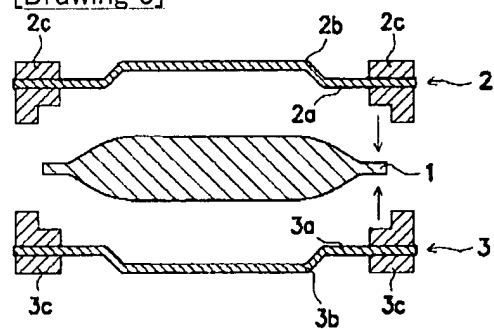


[Drawing 2]

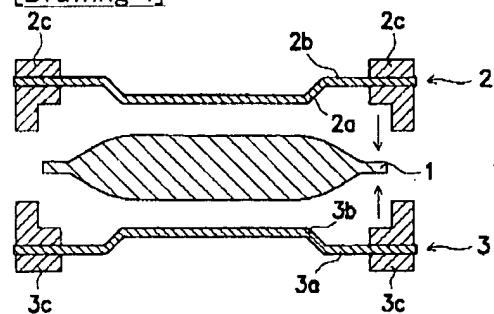




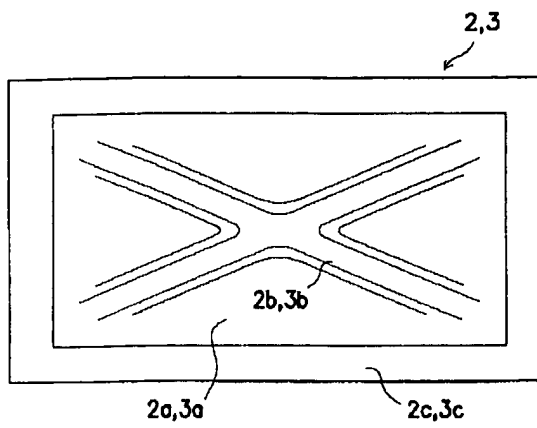
[Drawing 3]



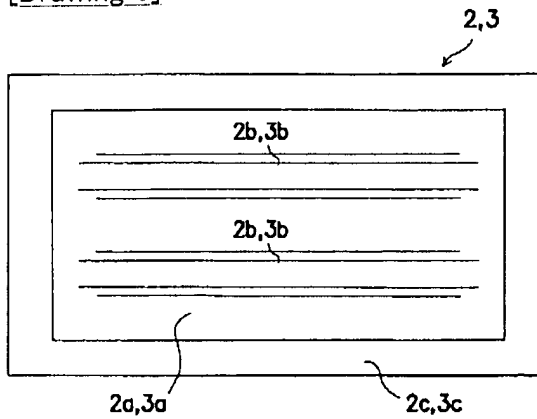
[Drawing 4]



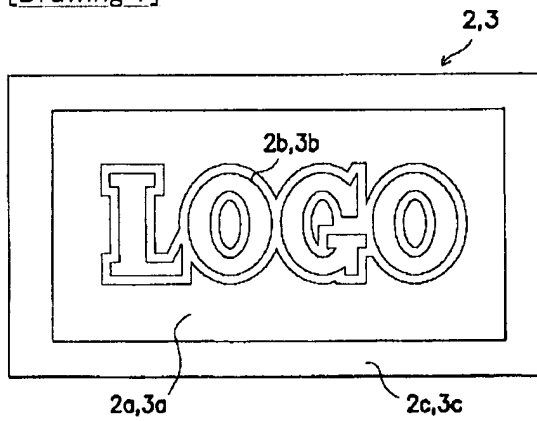
[Drawing 5]



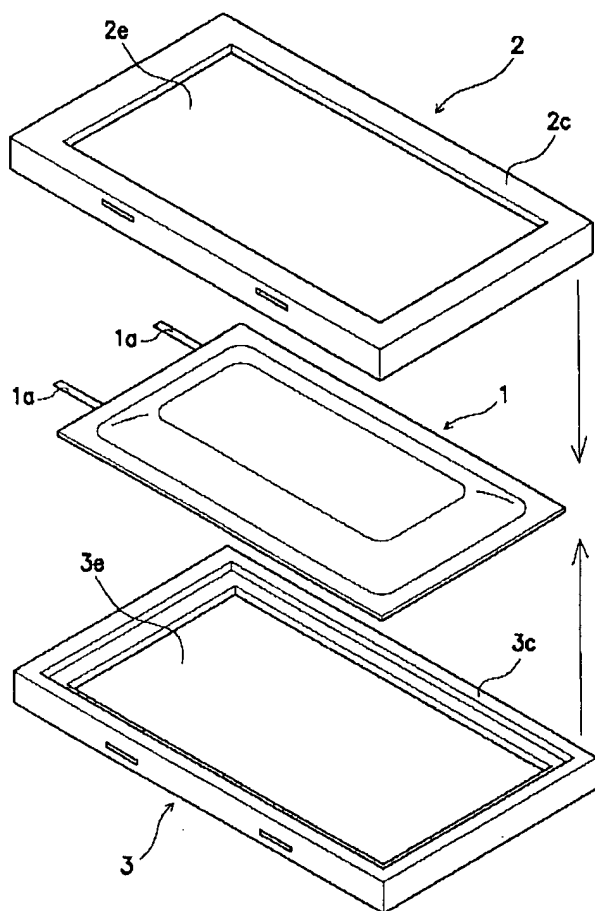
[Drawing 6]



[Drawing 7]



[Drawing 8]



[Translation done.]

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-176400

(43)Date of publication of application : 02.07.1999

(51)Int.Cl.

H01M 2/10

(21)Application number : 10-057814

(71)Applicant : JAPAN STORAGE BATTERY CO LTD

(22)Date of filing : 10.03.1998

(72)Inventor : ARIMA YOICHIRO  
TSUKAMOTO HISASHI

(30)Priority

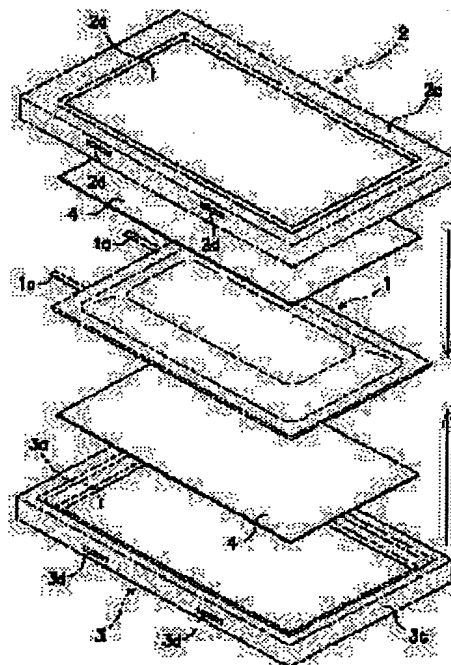
Priority number : 09272759 Priority date : 06.10.1997 Priority country : JP

## (54) BATTERY CASE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a light weight battery and its sufficient strength as well, by filling and superposing power generating elements between an upper and lower cases of an aluminum sheet which is made from a resin frame by insertion molding.

**SOLUTION:** Resin frames 2c, 3c are molded by insertion molding on a peripheral rim part of aluminum sheets 2a, 3a formed in a plate shape respectively in order to form an upper case 2 and a lower case 3. A container 1 of an aluminum laminated sheet is placed between the upper and lower cases 2, 3, and they are superposed from the top and bottom to form a battery case. Electrolyte resistant resin sheets 4 are pasted on inner surfaces of the upper and lower cases respectively. A lead wire 1a is connected to a terminal provided in the resin frames 2c, 3c in the battery case. As for the upper and lower cases superposed, a lower surface of the resin frame 2c and an upper surface of the resin frame 3c are jointed by ultrasonic welding to complete the battery case.



(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平11-176400

(43) 公開日 平成11年(1999) 7月2日

(51) Int.Cl.<sup>4</sup>  
H 0 1 M 2/10

識別記号

F I  
H 0 1 M 2/10

E

審査請求 未請求 請求項の数3 O L (全 7 頁)

(21) 出願番号 特願平10-57814

(22) 出願日 平成10年(1998) 3月10日

(31) 優先権主張番号 特願平9-272759

(32) 優先日 平9(1997)10月6日

(33) 優先権主張国 日本 (J P)

(71) 出願人 000004282

日本電池株式会社

京都府京都市南区吉祥院西ノ庄猪之馬場町  
1番地

(72) 発明者 有馬 要一郎

京都市南区吉祥院西ノ庄猪之馬場町1番地  
日本電池株式会社内

(72) 発明者 塚本 寿

京都市南区吉祥院西ノ庄猪之馬場町1番地  
日本電池株式会社内

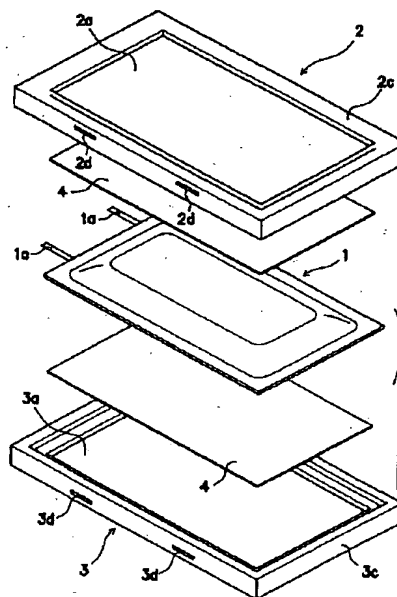
(74) 代理人 弁理士 河▲崎▼ 眞樹

(54) 【発明の名称】 電池ケース

(57) 【要約】

【課題】 上下ケース2、3にアルミニウム板2a、3aを用いると共に、これらのアルミニウム板2a、3aに凹凸状の補強部2b、3bを設けることにより、軽量でありかつ十分な強度を有する電池ケースを提供する。

【解決手段】 上下ケース2、3をアルミニウム板2a、3aの周縁部にインサート成形によって樹脂枠2c、3cを形成したものとし、これらのアルミニウム板2a、3aの板面に凹凸状の補強部2b、3bを設けた。



## 【特許請求の範囲】

【請求項1】 皿状に成形したアルミニウム板の周縁部にインサート成形によって樹脂枠を形成した上ケースと下ケースを、これらの間に発電要素を封入したシート容器を収容して重ね合わせると共に樹脂枠同士を接合させたことを特徴とする電池ケース。

【請求項2】 金属板の周縁部にインサート成形によって樹脂枠を形成した上ケースと下ケースを重ね合わせて樹脂枠同士を接合させることにより、内部に発電要素を封入したシート容器をこれら上下ケースの間に収容した電池ケースにおいて、

上下ケースの金属板としてアルミニウム板を用いると共に、これらのアルミニウム板の板面に、凹状又は凸状の補強部を設けたことを特徴とする電池ケース。

【請求項3】 上記アルミニウム板が、表面にアルマイト処理によって絶縁酸化被膜が形成されたものであることを特徴とする請求項1又は請求項2に記載の電池ケース。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、発電要素を封入したアルミラミネートシート等のシート容器を収容する電池ケースに関する。

## 【0002】

【従来の技術】近年の携帯用電子機器の急激な小形軽量化に伴い、その電源である電池に対しても、軽量で薄形でありかつ高エネルギー密度を有する二次電池の開発が要請されている。そこで、高エネルギー密度を有する二次電池として非水電解質二次電池を用い、この非水電解質二次電池をカード型にすることにより軽量薄形化を図ったカード型電池が従来から開発されている。

【0003】カード型電池は、図8に示すように、平型状の発電要素を封入したアルミラミネートシート容器1を上ケース2と下ケース3からなる電池ケースで覆って内部に収容したものである。上下ケース2、3は、いずれも平板状のステンレス板2e、3eの周縁部にインサート成形によって樹脂枠2c、3cを形成したものであり、これら上下ケース2、3を重ね合わせて周縁部の樹脂枠2c、3c同士を超音波溶接により接合することにより、内部にアルミラミネートシート容器1を収容する。

## 【0004】

【発明が解決しようとする課題】ところが、従来のカード型電池の電池ケースは、上下ケース2、3にステンレス板2e、3eを用いていたために、強度は十分であるが、重量が重くなりすぎ、電池の軽量化を阻害するという問題があった。

【0005】また、ステンレス板2e、3eを用いた場合、アルミラミネートシート容器1から引き出したリード線1a等との絶縁のために、これらのステンレス板2

e、3eの内面に絶縁テープを貼り付けておく必要があり、電池組み立て時の作業工程が増加するという問題もあった。

【0006】本発明は、かかる事情に鑑みてなされたものであり、上下ケースにアルミニウム板を用いることにより、電池の軽量化を図ることができる電池ケースを提供することを目的とし、また、このアルミニウム板に凹状又は凸状の補強部を設けることにより、軽量でありかつ十分な強度を有する電池ケースを提供することを目的としている。

## 【0007】

【課題を解決するための手段】請求項1の発明は、皿状に成形したアルミニウム板の周縁部にインサート成形によって樹脂枠を形成した上ケースと下ケースを、これらの間に発電要素を封入したシート容器を収容して重ね合わせると共に樹脂枠同士を接合させたことを特徴とする。

【0008】請求項1の発明によれば、上下ケースにアルミニウム板を用いるので、ステンレス板を用いる場合に比べて電池の軽量化を図ることができる。ここで、ステンレス板と同程度の厚さでは十分な強度が得られない場合には、アルミニウム板をある程度厚く形成する必要があるが、アルミニウム板の比重はステンレス板に比べて非常に小さいので、この板厚がある程度厚くなったとしても十分に軽量化を図ることは可能である。なお、アルミニウム板とは、アルミニウム又はアルミニウム合金を板状としたものをいう。

【0009】請求項2の発明は、金属板の周縁部にインサート成形によって樹脂枠を形成した上ケースと下ケースを重ね合わせて樹脂枠同士を接合させることにより、内部に発電要素を封入したシート容器をこれら上下ケースの間に収容した電池ケースにおいて、上下ケースの金属板としてアルミニウム板を用いると共に、これらのアルミニウム板の板面に、凹状又は凸状の補強部を設けたことを特徴とする。

【0010】請求項2の発明によれば、上下ケースにアルミニウム板を用いるので、請求項1の場合と同様に、ステンレス板を用いる場合に比べて電池の軽量化を図ることができる。しかも、これらのアルミニウム板の板面に凹状又は凸状の補強部を設けることにより十分な強度を得ることができるので、ステンレス板と同程度の板厚にすることも可能となり、さらなる軽量化を図ることができる。また、この補強部を設けることにより、インサート成形の際の加熱によってアルミニウム板の板面に反りが生じるのを防止することもできる。

【0011】請求項3の発明は、上記アルミニウム板が、表面にアルマイト処理によって絶縁酸化被膜が形成されたものであることを特徴とする。

【0012】請求項3の発明によれば、上下ケースのアルミニウム板の表面がアルマイト処理によって形成され

た絶縁酸化被膜で覆われるので、内部のリード線等との絶縁処理を行う必要がなくなり、工数を削減することができる。

【0013】

【発明の実施の形態】以下、本発明の実施形態について図面を参照して説明する。

【0014】図1は本発明の第1実施形態を示すものであって、カード型電池の構成を示す分解斜視図である。なお、図8に示した従来例と同様の機能を有する構成部材には同じ番号を付記する。

【0015】本実施形態は、従来例と同様に非水電解質二次電池をカード型にしたカード型電池について説明する。カード型電池は、アルミラミネートシート容器1を上ケース2と下ケース3からなる電池ケースの内部に収容したものである。アルミラミネートシート容器1には、例えば正負極をセパレータを介して巻回し押し潰すことにより平面化させた発電要素が非水電解液と共に封入されている。そして、2枚の柔軟なアルミラミネートシートを重ね合わせて周囲を封止したり、1枚のアルミラミネートシートを折って重ね合わせ折り目以外の周囲を封止することにより内部を密閉する。ただし、このアルミラミネートシート容器1の封止部からは、内部の発電要素の正負極に接続されたリード線1aがそれぞれ引き出されている。アルミラミネートシートは、アルミニウム箔にPET（ポリエチレンテレフタレート）フィルムやポリエチレンフィルム等をラミネートしたシートであり、ポリエチレンフィルム等の側の面を重ね合わせて加熱圧迫することにより熱溶着により封止することができる。また、リード線1aの引き出し部には、エパール樹脂フィルム等を介在させることにより金属との界面の封止を確実にしている。

【0016】上ケース2は、アルミニウム板2aの周縁部に樹脂枠2cを形成したものである。また、下ケース3も、アルミニウム板3aの周縁部に樹脂枠3cを形成したものである。これらのアルミニウム板2a、3aは、アルミニウム又はアルミニウムを主体とするアルミニウム合金からなる方形の板材である。また、これらのアルミニウム板2a、3aは、曲げ剛性を大きくするため皿状に成形する。前記樹脂枠2c、3cは、これらのアルミニウム板2a、3aの周縁部にインサート成形によって形成された枠体である。なお、これらのアルミニウム板2a、3aは、複数枚を連続してインサート成形するために、隣接するアルミニウム板2a、3aとの間をブリッジ部2d、3dで繋いでおき、樹脂枠2c、3cの成形後に各ブリッジ部2d、3dを切断するようにして製造している。

【0017】上記上下ケース2、3は、アルミラミネートシート容器1を間に介在させて上下から重ね合わせることで電池ケースとなる。この際、上下ケース2、3の内面には、耐電解液性の樹脂シート4、4を張り付

けておく。また、このアルミラミネートシート容器1から引き出されたリード線1aは、上ケース2又は下ケース3の樹脂枠2c、3cに設けられた図示しない端子に電池ケースの内部で接続しておく。このようにして重ね合わせた上下ケース2、3は、超音波溶接により樹脂枠2cの下面と樹脂枠3cの上面とを溶着接合させることにより電池ケースを完成させる。

【0018】上記樹脂シート4、4は、アルミラミネートシート容器1の内部から反応性の高い非水電解液が漏れ出した場合にも、この非水電解液がアルミニウム板2a、3aを浸食して外部に出ないようにするための保護膜である。従って、予めアルミニウム板2a、3aの内面に、これらの樹脂シート4、4と同様の素材の樹脂膜を被覆しておき、この状態で樹脂枠2c、3cをインサート成形するようにしてもよい。また、これらの樹脂シート4、4は、従来のステンレス板2e、3eの内面に貼り付けた絶縁テープと同様に、アルミニウム板2a、3aの内面とリード線1aとの間の絶縁の役割も果たす。

【0019】上記構成の電池ケースによれば、上下ケース2、3に軽量のアルミニウム板2a、3aを用いるので、図8に示した従来例のように重いステンレス板2e、3eを用いる場合に比べて電池の軽量化を図ることができる。つまり、これらのアルミニウム板2a、3aは、ステンレス板2e、3eと同じ板厚では強度が弱いので、通常はある程度厚いものを用いる必要があるが、アルミニウム又はアルミニウム合金の比重はステンレス鋼に比べて非常に小さいので、この板厚がある程度厚くなくても十分に軽量化を図ることができる。

【0020】なお、本実施形態では、アルミニウム板2a、3aの内面に樹脂シート4、4を張り付けたり樹脂膜を被覆する場合について説明したが、このアルミニウム板2aに予めアルマイト処理を施すことにより表面に絶縁酸化被膜を形成しておくようにしてもよい。このような絶縁酸化被膜を形成すれば、非水電解液による浸食の防止やリード線1aの絶縁を行うことができるので、樹脂シート4、4を張り付けたり樹脂膜を被覆する工程が不要となる。

【0021】図2～図7は本発明の第2実施形態を示すものであって、図2はカード型電池の構成を示す分解斜視図、図3はカード型電池の構成を示す分解縦断面図、図4はカード型電池の他の上下ケースの構成を示す分解縦断面図、図5は上下ケースのアルミニウム板に×印状の補強部を設けた場合を示す平面図、図6は上下ケースのアルミニウム板に平行状の補強部を設けた場合を示す平面図、図7は上下ケースのアルミニウム板にロゴ状の補強部を設けた場合を示す平面図である。なお、図1に示した第1実施形態と同様の機能を有する構成部材には同じ番号を付記する。

【0022】本実施形態も、第1実施形態と同様に非水

電解質二次電池をカード型にしたカード型電池について説明する。カード型電池は、図2に示すように、アルミラミネートシート容器1を上ケース2と下ケース3からなる電池ケースの内部に収容したものである。アルミラミネートシート容器1は、第1実施形態で示したものと同様のものを用いる。

【0023】上ケース2は、アルミニウム板2aの周縁部に樹脂枠2cを形成したものであり、下ケース3も、アルミニウム板3aの周縁部に樹脂枠3cを形成したものである。これらのアルミニウム板2a、3aは、第1実施形態と同様に、アルミニウム又はアルミニウムを主体とするアルミニウム合金からなる方形の板材であり、樹脂枠2c、3cも、これらのアルミニウム板2a、3aの周縁部にインサート成形によって一体成形された枠体である。ただし、アルミニウム板2a、3aは、図3に示すように、プレス加工により中央部が方形に突出した凸状及び凹状の補強部2b、3bを形成したものである。また、これらのアルミニウム板2a、3aは、予めアルマイト処理を施すことにより、表面に絶縁酸化被膜を形成しておく。なお、これらのアルミニウム板2a、3aも、第1実施形態の場合と同様に、樹脂枠2c、3cの成形後に各ブリッジ部2d、3dを切断したものをを用いることができる。

【0024】上記上下ケース2、3は、アルミラミネートシート容器1を間に介在させて上下から重ね合わせ、超音波溶接により樹脂枠2cの下面と樹脂枠3cの上面とを溶着接合させることにより電池ケースとする。また、この際、アルミラミネートシート容器1から引き出されたリード線1aは、上ケース2又は下ケース3の樹脂枠2c、3cに設けられた図示しない端子に電池ケースの内部で接続しておく。

【0025】上記構成の電池ケースによれば、上下ケース2、3に軽量のアルミニウム板2a、3aを用いるので、第1実施形態の場合と同様に、電池の軽量化を図ることができる。しかも、これらのアルミニウム板2a、3aの板面には、凹凸状の補強部2b、3bが形成されているので、剛性の高いステンレス板2e、3eと同程度の板厚のものを用いても、十分な強度を得ることができる。即ち、本実施形態のように丈夫なPETフィルム等をラミネートしたアルミラミネートシート容器1を用いる場合には、同じ板厚のステンレス板2e、3eと同等の強度は不要であり、このようなアルミニウム板2a、3aに補強部2b、3bを形成しただけでも、電池内部を保護するために十分な強度を得ることができる。また、これらのアルミニウム板2a、3aを従来のステンレス板2e、3eと同程度の板厚とすることにより、第1実施形態以上の軽量化を図ることができるようにする。

【0026】また、アルミニウム板2a、3aが第1実施形態の場合のように平板状であったとすると、これに

インサート成形によって樹脂枠2c、3cを成形した場合に、この成形加工の際の加熱によってアルミニウム板2a、3aの板面に反りが生じるおそれがある。しかし、上記構成のように、アルミニウム板2a、3aに凹凸状の補強部2b、3bを形成しておけば、この反りの発生も防止することができるようになる。

【0027】さらに、上記構成の電池ケースによれば、上下ケース2、3のアルミニウム板2a、3aが絶縁酸化被膜で覆われるので、アルミラミネートシート容器1から引き出したリード線1aを絶縁するためやアルミラミネートシート容器1から漏れ出した非水電解液による浸食を防止するために、これらのアルミニウム板2a、3aの内面に絶縁テープや樹脂シート4、4を貼り付ける面倒な作業工程も不要となり、組み立て作業を簡略化することができるようになる。

【0028】なお、上記実施形態では、電池ケースの外側に突出した補強部2b、3bを示したが、図4に示すように、電池ケースの内部側に突出させるようにしてもよい。また、上記実施形態では、これらの補強部2b、3bを方形の突起としたが、本発明はこれに限らず任意の形状の突起を用いることができる。例えば、図5及び図6に示すように、2筋の細長いリブ状の突起を×印状に交差させたり平行に並べた補強部2b、3bを設けることもでき、図7に示すように、この突起で適合なロゴを表示させて補強部2b、3bとすることもできる。

【0029】さらに、上記第1と第2の実施形態では、上下ケース2、3を接合するために超音波溶接を用いたが、その他の溶着手段や接着等の任意の接合手段を用いることができる。

【0030】さらに、上記第1と第2の実施形態ではアルミラミネートシート容器1を用いたが、本発明は必ずしもこれに限定するものではなく、任意のシート材によるシート容器を用いることができ、電池もカード型に限定されない。また、内部に封入する発電要素の構成も任意であり、非水電解質二次電池以外の電池についても同様に実施可能である。

【0031】

【発明の効果】以上の説明から明らかなように、本発明の電池ケースによれば、上下ケースにアルミニウム板を用いることにより電池の軽量化を図ることができる。

【0032】また、このアルミニウム板の板面に凹状又は凸状の補強部を設けることにより、十分な強度を得ると共に、インサート成形の際の反りの発生も防止することができるようになる。

【0033】さらに、上下ケースのアルミニウム板の表面にアルマイト処理による絶縁酸化被膜を形成することにより、このアルミニウム板の内面に絶縁テープを貼り付ける作業を不要にすることもできる。

【図面の簡単な説明】

【図1】本発明の第1実施形態を示すものであって、カ



ード型電池の構成を示す分解斜視図である。

【図2】本発明の第2実施形態を示すものであって、カード型電池の構成を示す分解斜視図である。

【図3】本発明の第2実施形態を示すものであって、カード型電池の構成を示す分解縦断面図である。

【図4】本発明の第2実施形態を示すものであって、カード型電池の他の上下ケースの構成を示す分解縦断面図である。

【図5】本発明の第2実施形態を示すものであって、上下ケースのアルミニウム板に×印状の補強部を設けた場合を示す平面図である。

【図6】本発明の第2実施形態を示すものであって、上下ケースのアルミニウム板に平行状の補強部を設けた場合を示す平面図である。

【図7】本発明の第2実施形態を示すものであって、上\*

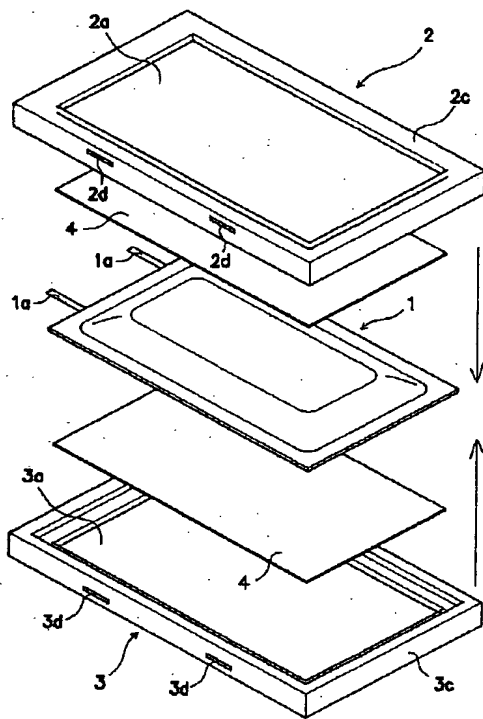
\*下ケースのアルミニウム板にロゴ状の補強部を設けた場合を示す平面図である。

【図8】従来例を示すものであって、カード型電池の構成を示す分解斜視図である。

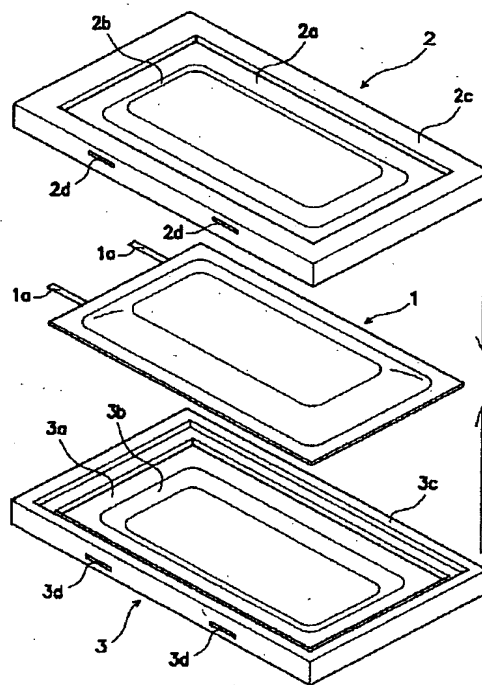
【符号の説明】

- 1 アルミラミネートシート容器
- 2 上ケース
- 2a アルミニウム板
- 2b 補強部
- 2c 樹脂枠
- 3 下ケース
- 3a アルミニウム板
- 3b 補強部
- 3c 樹脂枠

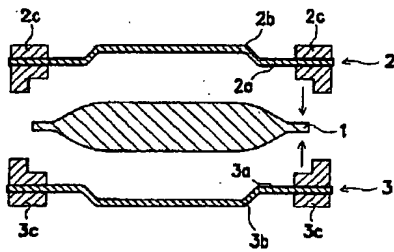
【図1】



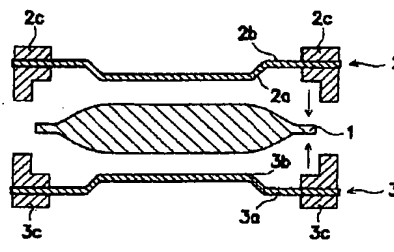
【図2】



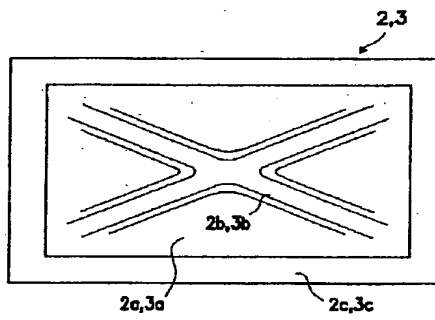
【図3】



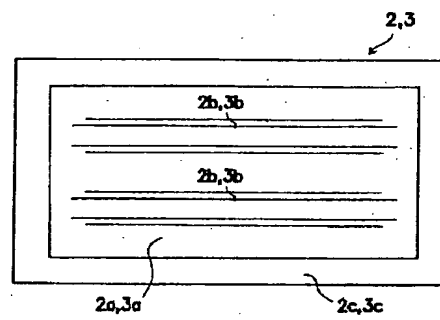
【図4】



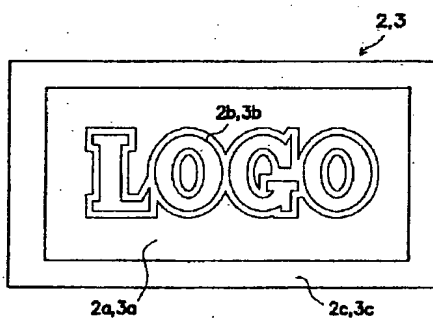
【図5】



【図6】



【図7】



(7)

特開平11-176400

【図8】

